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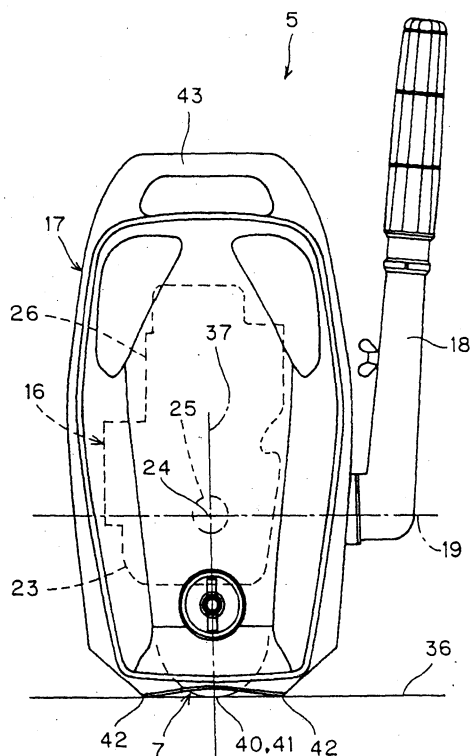
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(54) Outboard motor with supporting structure

(57) An outboard motor (5) comprises an outboard motor supporting structure having at least two spaced supporting projection portions (42) adapted to support

the outboard motor (5) in a stable position when being removed from a hull (3), brought to the "stowing attitude" and placed on a placing surface (36).

[FIG. 3]



Description

[0001] This invention relates to an outboard motor comprising an internal combustion engine and a power transmitting structure.

[0002] Many of small boats generally seen in use are provided with outboard motors removably supported on a hull as propulsion units.

[0003] Usually, the outboard motor comprises; a case elongate in one direction with its one end removably supported on a hull and with the other end made submersible in the water, a propeller supported on the other end of the case, an internal combustion engine capable of outputting power to the propeller through a power transmitting means housed inside the one end side of the case, and a cowling covering the internal combustion engine from above and supported with one end of the case. The internal combustion engine comprises; a crankcase supported with the one end of the case, and a cylinder projecting from the crankcase.

[0004] When the hull is to be propelled, the above-mentioned case is brought to the vertically elongate "usable attitude" and the other end of the case is submerged in the water together with the propeller. Next, the internal combustion engine is operated and its output power is transmitted through the transmitting means to the propeller. Then the propeller receives the power and rotates to propel the hull.

[0005] When the outboard motor is not in use, the outboard motor is removed from the hull, brought to the laterally elongate "stowage attitude", placed and supported on the horizontal placing surface, and stowed or transported in that state.

[0006] When the outboard motor is stowed or transported, it is preferable to keep the outboard motor in the "stowage attitude" on the placing surface in a more stabilized manner so that the stowage or transport is facilitated. However, sufficient consideration has not been given to the point of keeping the "stowage attitude" in a more stabilized manner.

[0007] There is another problem: if lubricant oil in the internal combustion engine flows toward the cylinder when the outboard motor is placed in the "stowage attitude", there is a risk of the oil wetting the ignition plug and making the start of the engine thereafter difficult, or the oil leaking through ports outside.

[0008] It is an objective of the present invention to provide an outboard motor comprising an internal combustion engine and a power transmitting structure, wherein the handling of the outboard motor is improved.

[0009] According to the present invention this objective is solved by an outboard motor comprising: an internal combustion engine and a power transmitting structure for transmitting driving power from said internal combustion engine to a propeller; an outboard motor supporting structure comprising at least two spaced supporting projection portions adapted to support the outboard motor in a stable position when being removed

from a hull.

[0010] It is an advantage of the present invention to facilitate the work of stowing or transporting an outboard motor when it is removed from a hull, brought to the laterally elongate "stowage attitude" and placed on a placing surface, by making it possible to keep the outboard motor in the "stowage attitude" in a more stabilized manner than in the conventional arrangement.

[0011] It is a further advantage of the present invention when the outboard motor is brought to the "stowage attitude", lubricant oil in the internal combustion engine does not wet the ignition plug or does not leak outside the engine.

[0012] Preferred embodiments of the present invention are laid down in the dependent claims.

[0013] Preferably the outboard motor comprises: a case 7 elongate in one direction with its one end 8 removably supported on a hull 3 and with its other end 10 made submersible in the water 2, a propeller 14 supported on the other end 10 of the case 7, an internal combustion engine 16 capable of outputting power to the propeller 14 through a power transmitting means 15 housed within the case 7 on the one end 8 side of the case 7, and a cowling 17 covering the internal combustion engine 16 from above and supported with the one end 8 of the case 7, said internal combustion engine 16 comprising; a crankcase 23 supported with the one end 8 of the case 7, and a cylinder 26 projecting from the crankcase 23, wherein said structure being adapted such that, when the outboard motor 5 is removed from the hull 3 and placed on a horizontal placing surface 36 in a lateral "stowage attitude" in which the cylinder 26 projects upward from the crankcase 23, portions 40, 41 of the case 7 on the underside of the other end 10 and a pair of portions 42, 42 of the underside of the cowling 17 on right and left of an imaginary vertical plane 37 passing the first-mentioned portions 40, 41 and extending along the longitudinal direction of the case 7 respectively come into contact with the placing surface 36.

[0014] Preferably said outboard motor is provided with a steering handlebar 18, and said steering handlebar 18 being rotatably pivoted on either the internal combustion engine 16 or the cowling 17, wherein, when the outboard motor 5 is brought to the "stowage attitude", the rotating end of the handlebar is capable of being placed above the cowling 17 by rotating the steering handlebar 18.

[0015] In the following, the present invention is explained in greater detail with respect to several embodiments thereof in conjunction with the accompanying drawings, wherein:

FIG. 1 is a side view, partially in cross section, of an outboard motor placed in a "stowage attitude";

FIG. 2 is a side view, partially in cross section, of the outboard motor placed in a "usable attitude";

and

FIG. 3 is a front view of the outboard motor placed in the "stowage attitude".

[0016] Embodiments will be hereinafter described in reference to the appended drawings.

[0017] FIG. 2 shows a boat 1 floating on the water 2 so as to be propelled in the forward direction indicated with the arrow Fr.

[0018] The boat 1 has a hull 3 with its rear part constituted with a transom 4. An outboard motor 5 is removably mounted and supported on the transom 4 and located behind the transom 4 to propel the hull 3. In FIG. 2, the outboard motor 5 is depicted in the "usable attitude".

[0019] The outboard motor 5 comprises a tubular case 7 elongate in one direction (vertical direction) with its one end, upper end 8, removably supported on a transom 4 by means of a clamp bracket 9 and with its other end 10 made submergible in the water 2. The case 7 is supported with the clamp bracket 9 so as to be rotatable about a support axis 11 located in the vicinity of and directed approximately parallel to the axis of the case 7.

[0020] The outboard motor 5 also comprises; a propeller 14 supported on the other end 10 of the case 7, an internal combustion engine 16 capable of outputting power to the propeller 14 through a power transmitting means 15 housed within and on the one end 8 side of the case 7, a cowling 17 covering the internal combustion engine 16 from above and supported on the one end 8 of the case 7 by means of a tightening member (not shown), and a steering handlebar 18 projecting by the side of the internal combustion engine 16 or the cowling 17.

[0021] The steering handlebar 18 is made rotatable about a support axis 19 extending in the direction of width of the hull 3, and projects toward the front, the hull 3 side, so as to be operated from the hull 3 side.

[0022] The internal combustion engine 16 comprises; the crankcase 23 supported with one end 8 of the case 7, the crankshaft 25 supported with the crankcase 23 and with its axis extending in the approximately vertical direction, a cylinder 26 projecting from the crankcase 23 in the radial direction (approximately horizontal rearward) of the crankshaft 25, a piston 27 inserted for axial sliding within the cylinder 26, a connecting rod 28 connecting the piston 27 for interlocked movement to the crankshaft 25, and an oil pan 29 closing the bottom opening of the crankcase 23 from under.

[0023] A space surrounded with the cylinder 26 and the piston 27 is made a combustion chamber 30. A valve means 31 is provided to open and close a port for making gas communication between the combustion chamber 30 and the outside of the internal combustion engine 16. An ignition plug (not shown) is provided to face the combustion chamber 30. Lubricant oil 32 for lubricating the internal combustion engine 16 collects in the oil pan

29 within the internal combustion engine 16.

[0024] When the hull 3 is to be propelled, the outboard motor 5 is brought to the vertically elongate "usable attitude" and the other end 10 is submerged in the water 2 together with the propeller 14. Next, the internal combustion engine 16 is operated and its output power is transmitted through the transmitting means 15 to the propeller 14. Then the propeller 14 rotates to propel the hull 3.

[0025] Steering from the hull 3 side is made by gripping the projecting end of the steering handlebar 18 and swinging it right and left about the support axis 11 together with right and left swinging of the internal combustion engine 16, the cowling 17, the case 7, and the propeller 14.

[0026] As shown in FIGs. 1 and 3, when the clamp bracket 9 is loosened and the outboard motor 5 is removed from the hull 3, and placed on the horizontal placing surface 36 in the laterally oblong "stowage attitude" so that the cylinder 26 projects upward from the crankcase 23, the portions 40, 41 of the other end 10 of the case 7 on the underside, and a pair of portions 42, 42 on the right and left underside of the cowling 17 with respect to the imaginary vertical plane 37 passing the former portions 40, 41 and extending along the longitudinal direction of the case 7 respectively come into contact with the placing surface 36. In this way, the outboard motor 5 is supported on the placing surface 36.

[0027] In the above case, the imaginary vertical plane 37 passes approximate center of the width of the case 7 (approximately the support axis 11). The center of gravity of the outboard motor 5 is approximately located on the imaginary vertical plane 37 and also located between the portions 40, 41 of the case and the portions 42, 42 of the cowling 17 with respect to the longitudinal direction of the case 7. The portions 42, 42 of the underside of the cowling 17 are located at approximately the same distances from the imaginary vertical plane 37 and project out (down) from the main part of the cowling 17.

[0028] Therefore, the outboard motor 5 in its "stowage attitude" is placed in a three-point support state with the portions 40 to 42 in contact with the placing surface 36.

[0029] As a result, the outboard motor 5 remains in the stabilized "stowage attitude" on the placing surface 36, and the work of stowage and transport is facilitated.

[0030] When the outboard motor 5 is in the "stowage attitude", the cylinder 26 of the internal combustion engine 16 is held to the state of projecting up from the crankcase 23. Therefore, the lubricant oil 32 in the internal combustion engine 16 collects in the inside bottom part of the crankcase 23 and does not flow toward the cylinder 26.

[0031] Therefore, the lubricant oil 32 in the internal combustion engine 16 does not wet the ignition plug and does not leak outside the internal combustion engine 16.

[0032] It is also arranged as described above that, when the outboard motor 5 is brought to the "stowage

attitude" and placed on the placing surface 36, the clamp bracket 9 is capable of being positioned above the case 7 by rotating it about the support axis 11, and the rotating end side of the steering handlebar 18 is also capable of being positioned above the cowling 17 by rotating the handlebar about the support axis 19.

[0033] Therefore, as shown in FIG. 1, when the outboard motor 5 is brought to the "stowage attitude" and placed on the placing surface 36, if the rotating end of the steering handlebar 18 and the clamp bracket 9 are positioned above the cowling 17 and the case 7, the steering handlebar 18 and the clamp bracket 9 are prevented from contacting the placing surface 36. As a result, the outboard motor 5 is held unchanged in the "stowage attitude" in a more stabilized manner on the placing surface 36 without being obstructed with the steering handlebar 18.

[0034] A grip 43 is integrally formed with the cowling 17 on the upper surface side of the cowling 17 and on the imaginary vertical plane 37 in the state of the outboard motor 5 in the "stowage attitude".

[0035] Therefore, the work of changing the outboard motor 5 from the "usable attitude" to the "stowage attitude" is made easier by gripping the grip 43.

[0036] While the above description is made by way of the example shown, it may be alternatively arranged that only one of the portions 40, 41 of the case 7 on the underside is placed on the placing surface 36. It may also be arranged that the portions 40, 41 project from the main part side of the case 7 toward the placing surface 36.

[0037] The embodiment described above shows a structure for stowing an outboard motor, said outboard motor comprising; a case elongate in one direction with its one end removably supported on a hull and with its other end made submergible in the water, a propeller supported on the other end of the case, an internal combustion engine capable of outputting power to the propeller through a power transmitting means housed within one end side of the case, and a cowling covering the internal combustion engine from above and supported with one end of the case, said internal combustion engine comprising; a crankcase supported with the one end of the case, and a cylinder projecting from the crankcase, wherein said structure being adapted such that, when the outboard motor is removed from the hull and placed on a horizontal placing surface in a lateral "stowage attitude" in which the cylinder projects upward from the crankcase, portions of the case on the underside of the other end and a pair of portions of the underside of the cowling on right and left of an imaginary vertical plane passing the first-mentioned portions and extending along the longitudinal direction of the case respectively come into contact with the placing surface.

[0038] As a result, the outboard motor in its "stowage attitude" is placed in a stabilized three-point support state with the portions in contact with the placing surface.

[0039] Therefore, the work of stowing and transporting the outboard motor is made easier as the outboard motor is held in the stabilized "stowage attitude" on the placing surface.

[0040] When the outboard motor is in the "stowage attitude", the cylinder of the internal combustion engine is held to the state of projecting up from the crankcase. Therefore, the lubricant oil in the internal combustion engine collects in the inside bottom part of the crankcase and does not flow toward the cylinder.

[0041] Therefore, the lubricant oil in the internal combustion engine is prevented from wetting the ignition plug and from leaking outside the internal combustion engine.

[0042] Moreover, according to the structure for stowing an outboard motor, said outboard motor being provided with a steering handlebar, and said steering handlebar being rotatably pivoted on either the internal combustion engine or the cowling, wherein, when the outboard motor is brought to the "stowage attitude", the rotating end side of the handlebar is capable of being placed in a position higher than the cowling by rotating the steering handlebar.

[0043] Therefore, the steering handlebar is prevented from contacting the placing surface when the rotating end of the handlebar is placed above the cowling in the state of the outboard motor being brought to the "stowage attitude" and placed on the placing surface.

[0044] As a result, the outboard motor is held unchanged in the "stowage attitude" in a more stabilized manner than in conventional arrangement on the placing surface without being obstructed with the steering handlebar, and the work of stowage and transport is further facilitated.

[0045] The embodiment described above is suitable to facilitate the work of stowing or transporting an outboard motor by keeping it in a more stabilized "stowage attitude" when it is removed from a hull and placed in the horizontally oblong "stowage attitude" on a placing surface, and to prevent lubricant oil in an internal combustion engine from wetting an ignition plug and from leaking outside the internal combustion engine when the outboard motor is brought to the "stowage attitude."

[0046] Thus it is arranged, when an outboard motor 5 is removed from a hull 3 and placed in a horizontally oblong "stowage attitude" on a placing surface 36 with a cylinder 26 projecting up from a crankcase 23, so that portions 40, 41 on the underside of a distal end 10 of the case 7 of the outboard motor 5 and a pair of portions 42, 42 on the underside of a cowling 17 on right and left of an imaginary vertical plane 37 passing the portions 40, 41 and extending along the longitudinal direction of the case 7 respectively come into contact with the placing surface 36.

[0047] The outboard motor according to the embodiment comprises an internal combustion engine 16 and a power transmitting structure 7, 15 for transmitting driving power from said internal combustion engine 16 to a

propeller 14. Said outboard motor further comprises an outboard motor supporting structure comprising at least two spaced supporting projection portions 42 adapted to support the outboard motor in a stable position when being removed from a hull 3.

[0048] A cowling 17 covering said internal combustion engine 16 is provided, wherein said cowling 17 is provided with the supporting projection portions 42.

[0049] Said internal combustion engine 16 comprises a cylinder 26 extending in a first direction, and the supporting projection portions 42 are projecting in a direction opposite to the extending direction of said cylinder 26.

[0050] Said power transmitting structure comprises a case 7 elongating in a second direction with a first end 8 removably supported on the hull 3 and with a second end 10 made submergible in the water 2, said case 7 is provided with at least one further supporting projection portion 40,41 on the second end 10 thereof.

[0051] Said propeller 14 is supported on the second end 10 of the case 7 and facing in a direction which is substantially perpendicular with the second direction, and said further supporting projection portion 40,41 is projecting a direction opposite to the facing direction of said propeller 14, wherein the supporting projection portions 42 are provided on a same side as the further supporting projection portion 40, 41.

[0052] A center of gravity of the outboard motor is provided between the spaced supporting projection portions 42 and the further supporting projection portion 40, 41 with regard to the second direction. Said supporting projection portions 42 are provided on right and left of an imaginary vertical plane 37 passing the further supporting projection 40, 41 and extending along the second direction. The center of gravity of the outboard motor is located approximately in said vertical plane 37.

[0053] A steering handlebar 18 is rotatably pivoted on either the internal combustion engine 16 or the cowling 17, wherein said steering handlebar 18 is positionable out of a plane defined by said supporting projection portions 42 and the further supporting projection 40,41.

[0054] A clamp bracket 9 is moveably provided on the case 7, wherein said clamp bracket 9 is positionable out of a plane defined by said supporting projection portions 42 and the further supporting projection 40, 41.

Claims

1. An outboard motor comprising:

an internal combustion engine (16) and a power transmitting structure (7,15) for transmitting driving power from said internal combustion engine (16) to a propeller (14);
an outboard motor supporting structure comprising at least two spaced supporting projection portions (42) adapted to support the out-

board motor in a stable position when being removed from a hull (3).

2. An outboard motor according to claim 1, **characterized by** a cowling (17) covering said internal combustion engine (16), wherein said cowling (17) is provided with the supporting projection portions (42).
3. An outboard motor according to claim 1 or 2, **characterized in that** said internal combustion engine (16) comprises a cylinder (26) extending in a first direction, and the supporting projection portions (42) are projecting in a direction opposite to the extending direction of said cylinder (26).
4. An outboard motor according to at least one of the claim 1 or 3, **characterized in that** said power transmitting structure comprises a case (7) elongating in a second direction with a first end (8) removably supported on the hull (3) and with a second end (10) made submergible in the water (2), said case (7) is provided with at least one further supporting projection portion (40,41) on the second end (10) thereof.
5. An outboard motor according to claim 4, **characterized in that** said propeller (14) is supported on the second end (10) of the case (7) and facing in a direction which is substantially perpendicular with the second direction, and said further supporting projection portion (40,41) is projecting a direction opposite to the facing direction of said propeller (14), wherein the supporting projection portions (42) are provided on a same side as the further supporting projection portion (40, 41).
6. An outboard motor according to claim 4 or 5, **characterized in that** a center of gravity of the outboard motor is provided between the spaced supporting projection portions (42) and the further supporting projection portion (40, 41) with regard to the second direction.
7. An outboard motor according to at least one of the claims 4 to 6, **characterized in that** said supporting projection portions (42) are provided on right and left of an imaginary vertical plane (37) passing the further supporting projection (40, 41) and extending along the second direction.
8. An outboard motor according to claim 7, characterized in that a center of gravity of the outboard motor is located approximately in said vertical plane (37).
9. An outboard motor according to at least one of the claims 4 to 8, **characterized by** a steering handlebar (18) being rotatably pivoted on either the inter-

nal combustion engine (16) or the cowling (17), wherein said steering handlebar (18) is positionable out of a plane defined by said supporting projection portions (42) and the further supporting projection (40, 41).

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10. An outboard motor according to at least one of the claims 4 to 9, **characterized by** a clamp bracket (9) moveably provided on the case (7), wherein said clamp bracket (9) is positionable out of a plane defined by said supporting projection portions (42) and the further supporting projection (40, 41).

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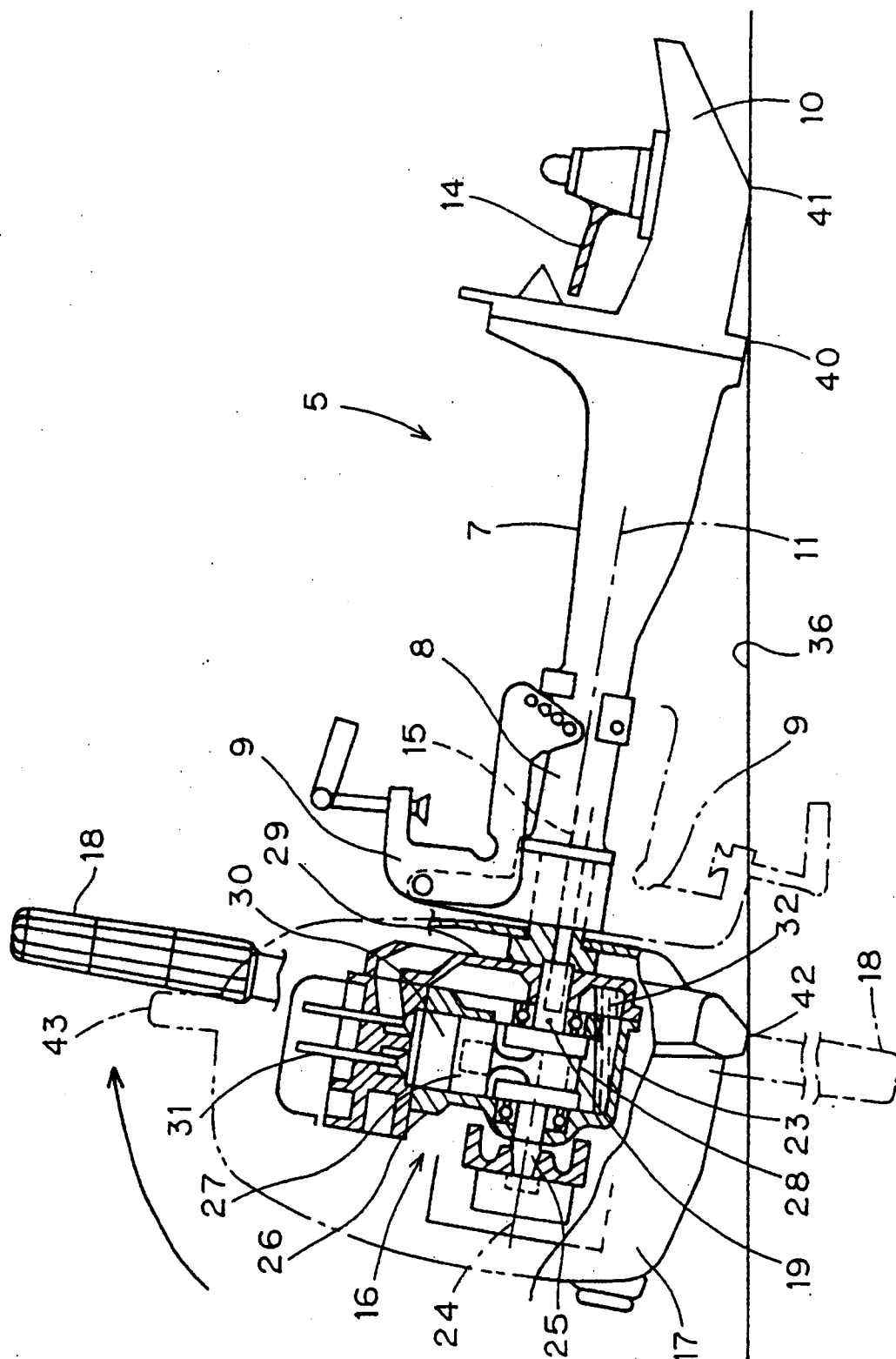
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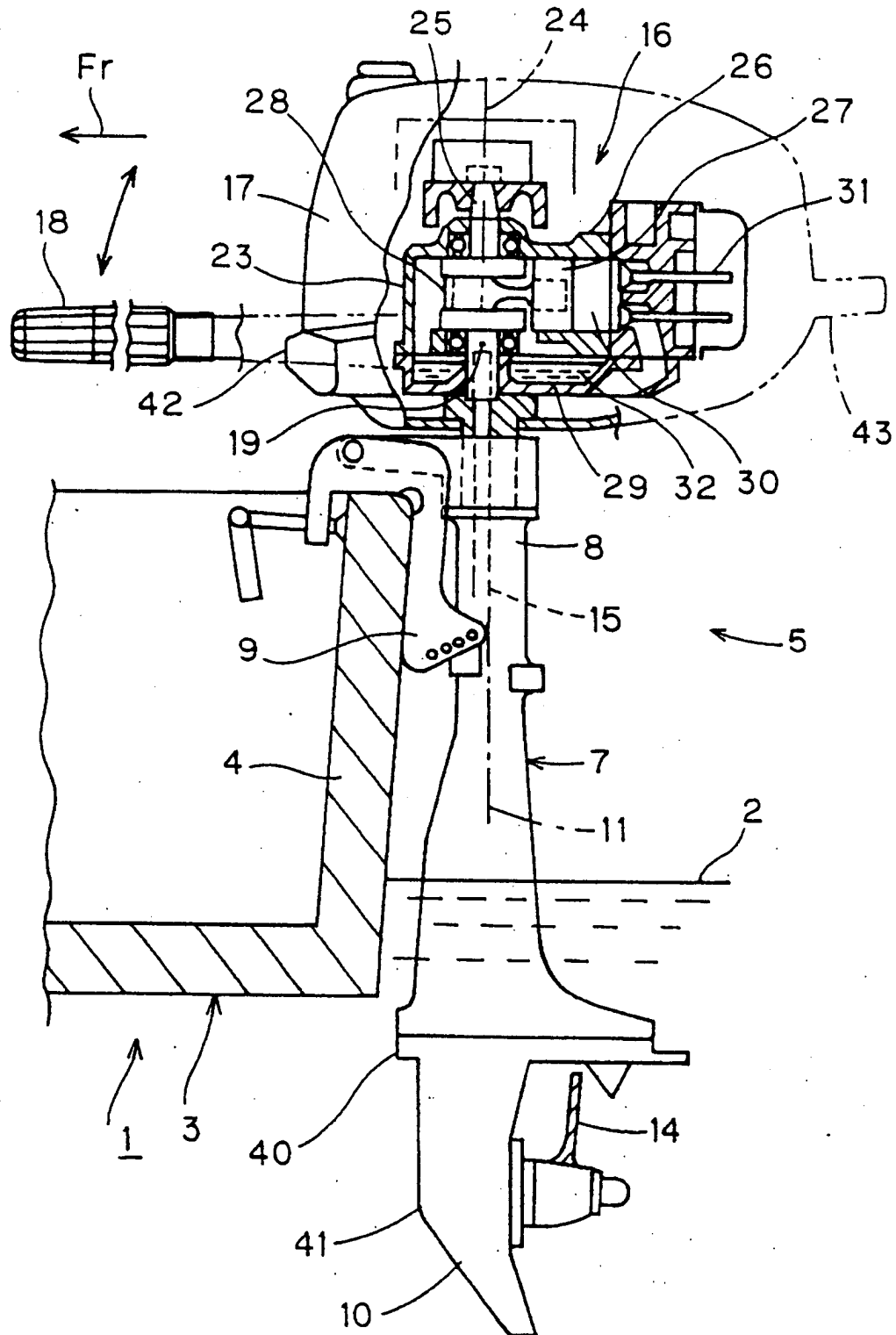
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[FIG. 1]



[FIG. 2]



[FIG. 3]

